The Prevalence of Hepatitis C Virus Among Thalassemia Patients referred to Shahid Beheshti Hospital, Abadan, Iran

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Abstract
Background: Hepatitis C virus (HCV) infection as a serious medical issue is one of the most important pathogens of the human. Youngsters with thalassemia who get blood transfusions are endangered with a high risk of HCV contamination.

Objective: This review intended to study the predominance of HCV among thalassemia patients in Abadan, Khuzestan, in the south-west of Iran.

Materials and Methods: For this study, a specific questionnaire on demographic information (age, number of blood transfusions) was completed by trained personnel based on acquired information from patient records, and also blood samples were taken at the same time in order to check the presence and level of anti-HCV antibodies.

Results: As a result, it was shown that from 179 patients 20 (11.17%) were positive for anti-HCV antibodies.

Conclusion: The HCV infection is an illness which influences extensive number of thalassemia patients in the world. The lack of knowledge about blood safety and HCV infection as the most predominant illness transmitted with contaminated blood in thalassemia patients is a major threat to public health in a group of countries including Iran and the data are mostly obtained from provinces of Iran. The prevalence of HCV infection in patients with thalassemia who live in Khuzestan province is less than that in other provinces of Iran and also neighbour countries; and researchers should pay attention to hepatitis C infection in order to prevent thalassemia cases.

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of Abadan, Khuzestan province, from March 2012 to April 2016. After admitting the patients, written and signed consent was obtained, and a specific questionnaire on demographic information (age, number of blood transfusions) was completed by trained personnel based on information acquired from patient records, and also blood samples were taken at the same time in order to check the presence and level of anti-HCV antibodies. An amount of 3 cc blood specimens were taken from volunteers in aseptic conditions and immediately sent to the laboratory. The samples were centrifuged at 2000 rpm for 10 minutes and isolated serum was held at -20°C until testing. Then, Elisa test for anti-HCV antibody was done for all samples at the same conditions, using diagnostic kits according to the manufacturer’s instructions (ELA Well, Radim, Italy) and according to enzyme immunoassay.

Results
One hundred seventy-nine thalassemia patients, admitted to Shahid Beheshti hospital, Abadan, during 2012-2016, were tested. Among them, 98 (54.7%) and 81 patients (45.2%) were male and female, respectively. A total of 179 blood specimens were collected. Of 179 patients, 20 (11%) were positive for anti-HCV antibodies and the mean and standard deviation of age for them was 30.5 ± 9.1. The mean and standard deviation of age for the females positive for anti-HCV antibody was 32.2 ± 11.26 (the youngest: 8 years old, and the oldest: 54 years old) while for the males was 27.9 ± 6.1 (the youngest: 19 years old, and the oldest: 38 years old). Accordingly, from these patients, 10 (50%) were male and 10 (50%) were female. The outcome demonstrated that the prevalence of anti-HCV antibody in thalassemia patients was 11.17% (20/179). Moreover, regarding the number of blood units transfused per month, the patients were classified into 3 groups: group 1 received less than 1 unit (20%), group 2 received 1-2 units (70%) and group 3 received more than 2 units (10%). Additionally, 80% received blood units less than 1 month and 20% received blood units more than 2 months (Table 1).

Discussion
The HCV infection is a prevalent infection which affects a vast number of thalassemia patients worldwide. It is considered as a major public health problem in high risk groups. These patients act as a reservoir of this infection as one of the principle deterrents for HCV disease controlling in the community. The first transfusion before or after introducing the blood donors screened for anti-HCV antibody was the main determinant of HCV infection in the region. The lack of information about blood safety and HCV contamination as the most predominant illness transmitted with contaminated blood in thalassemia patients is a noteworthy risk to public health of these nations. The data regarding HCV infection was mostly obtained from Iran. There were significant contrasts between the rates of HCV contamination in the regions. The highest and the lowest prevalence rates were seen in Semnan (32%) and Zanjan (2%), respectively. The heterogeneous pattern of geographical distribution of HCV contamination in thalassemia is different in numerous regions and might be identified with the pervasiveness of HCV and hazardous factors in blood donors and the overall population.

In this study, the prevalence of HCV among 179 thalassemia patients was 20 (11.17%). This study demonstrated that hemodialysis patients and thalassemia cases were at higher risk of HCV contamination; around 11.17%. Alavian et al showed that the prevalence of HCV was 11% in Tehran in 2005. In one study conducted by Javadzadeh et al in 2006 in city of Yazd, 85 patients with thalassemia major were included, from which 9.4% were positive for anti-HCV. In another study by Zahedi et al, HCV antibody was positive in 16 patients (7%), comprised of 12 males and 4 females (age range: 4-46 years old). In a study by Fattahi et al in Shiraz, 15 out of 6095 members (0.25%) were found positive for anti-HCV, including 8 females and 7 males. Faranoush et al in Semnan found that 39.7% of the patients were positive for anti-HCV antibodies. In another review by Jafroodi et al in the city of Rasht, among 1113 thalassemia cases, 152 were observed to be positive for anti-HCV, giving a general pervasiveness of 13.6% for HCV. The risk of being HCV positive was 1.5 times higher among males than females. In a similar study in Isfahan by Nokhodian et al, the frequency of HCV antibody in regular donors and first-time blood donors was 0.23% and 0.53%, respectively.

There are more than 25 000 patients with thalassemia major in Iran. It is a severe medical issue throughout Iran especially Khuzestan province. This review demonstrated that the predominance of anti-HCV in thalassemia patients is 11.17%. According to a report from north of Iran, 63.8% predominance of anti-HCV in thalassemia is contrasted with 0.5% in blood donors. In this report, corroborative insusceptible immunoblotting was tested on HCV positive cases, for whom 92.6% of

Table 1. Baseline Characteristics of Thalassemia Patients Positive for Anti-HCV Antibody

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. (%)</th>
<th>Mean Age</th>
<th>Group 1a No. (%)</th>
<th>Group 2b No. (%)</th>
<th>Group 3c No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>20/179 (11.7)</td>
<td>30.5 ± 9.1</td>
<td>4 (20)</td>
<td>14 (70)</td>
<td>2 (10)</td>
</tr>
<tr>
<td>Male</td>
<td>10 (50)</td>
<td>27.9 ± 6.1</td>
<td>3 (75)</td>
<td>7 (50)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Female</td>
<td>10 (50)</td>
<td>32.2 ± 11.26</td>
<td>1 (25)</td>
<td>7 (50)</td>
<td>2 (100)</td>
</tr>
</tbody>
</table>
tests were positive. In a study conducted by Karimi and Ghavanini in Shiraz, south of Iran, from 466 thalassemia youngsters with several previous transfusions, 73 (15.7%) were positive for anti-HCV. The results from another review on Iranian thalassemia patients uncovered that 24.2% of them were positive for anti-HCV. The nations with a higher pervasiveness of HCV in all populace had a higher rate among thalassemia patients, as well. For example, a review in Egypt revealed 75% pervasiveness of HCV among thalassemia patients, considering that the predominance in their blood donors’ populace was 14.5%. While, in India with a low pervasiveness of HCV among blood donors (1.78%), the predominance in thalassemia was accounted generally low (25.5%). However, these perceptions specifically indicated blood transfusion as the great risk factor for HCV contamination among thalassemia patients and affirmed the number of donors screened in viral transmission. In spite of the fact that it appears blood donor screening venture lessened HCV contamination, utilizing more exact technique is fundamental keeping in mind the end goal to locate the viral disease and treat thalassemia patients with HCV contamination more precisely.

### Conclusion

HCV infection is a disease that affects a large number of thalassemic patients around the world. The patients act as a reservoir of this infection as one of the main obstacles for HCV infection controlling in the community. The anti-HCV prevalence in patients with thalassemia who live in Khuzestan province is less than other provinces of Iran and also neighbor countries. Lack of information about blood safety and HCV contamination is the most important factor in the transmission of disease in thalassemic patients and poses a serious threat to public health.

Because of expansion of hepatitis C in thalassemia patients, performing particular tests, frequent follows-up, and incite treatment is important. Moreover, specialists ought to be focused on hepatitis C contamination in order to avert thalassemia cases. Among the major countries, Iran has minimal prevalence of HCV contamination among thalassemia patients and furthermore Iran has a higher rank in blood safety compared to different nations in the area.

### Authors’ Contributions

Conception and design: SK; Data acquisition: AT; Analysis and interpretation of data: SJ; Drafting of the manuscript: AZ; Critical revision of the manuscript for important intellectual content: NT; Statistical analysis: NHM; Obtaining funding: NJ; Administrative, technical, or material support: NJ; Supervision: NJ.

### Ethical Approval

The local ethical committee approved the study (Code No. IR.ABADANUMS.REC.1394.67)

### Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

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